Siemens Automotive Corporation 1/01
Pollution Prevention Program

Siemen's Automotive Corporation's corporate goals include objectives related specifically, and indirectly, to environmental improvements and pollution prevention. Examples of specific goals that have been reached in the past:

Injector Innovations and Pollution Prevention Achievements: Siemens Automotive Corporation's commitment to a sustainable future is illustrated by our environmentally compatible Deka IV fuel injector, designed in Newport News. The Deka IV was designed, developed and put into production by the Deka Project Team under the company's Produce Program management System which takes into consideration the environmental impacts of new product designs and processes. Deka IV replaces the Deka I in the Siemens Automotive product evolution. 1999 marked the construction and full ramp-up of a new state-of-art clean room for the manufacture of Deka IV injectors.

The Deka IV family of injectors includes standard, short and long models, air assist, extended tip and extended tip air assist versions to accommodate any customer need.

The Deka IV fuel injector is much smaller than the Deka I it replaces, resulting in less material usage. The standard version weighs 62% less than the standard Deka I. The Deka IV short version weighs 70% less than the Deka I. Other features include:

- Stainless steel components and polyamide (nylon) overmolding improve corrosion resistance and eliminate zinc-alloy plating and a chromate conversion coating that contain suspected persistent, bioaccumulative and toxic (PBT) elements.
- A stainless steel part replace a leaded-steel alloy part, eliminating a possible hazardous waste stream.
- Scrap metal chips from machining operations were reduced by 76%. Based on current production levels, this represents 2,140,000 lb. less metal consumed annually. An oil-chip separator unit enables the company to recycle the metal chips and reuse over 14,100 gallons of petroleum-based cutting fluid annually, saving the company over $66,000 annually.
- Scrap polyamide (nylon) sprues and runners from overmolding the integral electrical connector were reduced by 80%, eliminating the need to purchase 172,000 lb. of glass-filled, polyamide molding material annually, resulting in savings of approximately $204,680 per year.
- Fewer different material types and no internal fluorocarbon elastomer O-rings will facilitate end-of-life recycling.
- VOC emissions from the redesigned Deka IV injector calibration and test lines have been reduced by 50% (28.4 tons per year). This will enable the facility ultimately to double injector production volumes and still maintain its "minor source" permit status for VOC emissions without the need for costly emission control equipment. Based on current production levels calibration fluid usage has been reduced by 8,700 gallons per year, saving approximately $26,000 annually.
- Returnable shipping containers are used instead of disposable cardboard.
- Aqueous cleaning processes replace HCFC solvent vapor degreasing for in-process and final cleaning operations.

- The stainless steel construction and dry bobbin design (no rubber or plastic parts in the fuel path) have improved chemical resistance to oxygenated, alternate fuels for improved durability, long-term performance and increased product life.
- The Deka thin edge orifice minimizes tip fouling from poor quality fuel for improved vehicle emissions and performance.
- The smaller diameter Deka IV injector provides greater packaging flexibility for more precise positioning of the injector on the engine. This, in combination with a patented extended tip and reoriented fuel stream capability, allows more precise fuel
- The smaller diameter Deka IV injector provides greater packaging flexibility for more precise positioning of the injector on the engine. This, in combination with a patented extended tip and reoriented fuel stream capability, allows more precise fuel spray targeting to minimize intake port wall wetting, one of the primary contributors to increased vehicle hydrocarbon emissions.

Volatile Organic Compound (VOC) Emissions Reduction Efforts:

- Fuel injectors are calibrated and tested on automated test lines using an industry standard, hydrocarbon-based calibration fluid. Although 99% of the calibration fluid is captured and reused, it is a source of VOC emissions, a pre-cursor to the formation of ground-level ozone, a serious air pollutant in the USA. Siemens Automotive Corporation's Test Equipment Engineering Team designed, developed and installed special "low loss" heads on the Deka I automated calibration and test equipment. Retrofitting Deka I test lines with the "low loss" heads at a cost of $250K reduced VOC emissions per injector tested by an average of 47% (51 tons per year)
- Furthermore, the Test Equipment Team, working closely with the test equipment supplier, incorporated the Siemens Automotive "low loss" heads in redesigned Deka IV injector calibration and test lines. VOC emissions per injector tested from the redesigned Deka IV injector calibration and test lines have been reduced an additional 50% (28.4 tons per year).
- Over the period 1996-2000 the Test Equipment Engineering Team at Siemens Automotive in Newport News reduced VOC emissions per injector tested from injector calibration and test lines by a combined 75% compared to VOC emission rates prior to 1996.

The following are examples of active or planned pollution prevention initiatives that are included in the Siemens Automotive Corporation Environmental Management System:

- **Scrap Reduction:** Scrap utilizes a tremendous quantity or resources and results in the generation of waste. Although the majority of our scrap is recycled, all departments have specific targets for scrap reduction and thereby waste minimization.
- **Office Paper Recycling:** In 2000, we re-evaluated our office paper recycling program and implemented a new system. We deployed new bins, developed maps, and have begun segregating office mix and white bond paper. The project was completed November 30, 2000.
- **Pallet Recovery:** In late 1999, we initiated a pallet recover and recycling program. The program should save, on average, approximately $25,000 per year.
- **Plastic Molding Scrap Recycling:** In 2000, we eliminated the grinding of scrap plastic from injection molding operations. We are switching to baling and shrink-wrapping the plastic in a cardboard baler for recycling. Our goal is to have the system fully operational

by February 28, 2001. We estimate that baling of plastic for recycling will save Siemens Automotive Corporation approximately $30,000 per year.

- **Energy Conservation:** We are in the process of designing and implementing a plantwide energy conservation program. Our goal is to have the program implemented by September 30, 2001.
- **Waste to Energy:** We plan to divert the remainder of our non-regulated waste, that cannot be recycled, to the NASA Steam Plant. This project will divert approximately 750,000 pounds of waste from the landfill and convert it to energy at the steam plant. Our goal is to divert the trash to the steam plant by March 31, 2001.